Confinement Improvement

Energetic electrons confined

Fokker-Planck modeling (CQL3D) -
• Runaway electron density ~ 2%
• Connection lengths ~ 100 km
• Diffusion coefficient < 5 m²/s
• Magnetic surfaces maybe becoming well-formed

Potential and density fluctuations

(Heavy ion beam probe, RPI)

Electrostatic particle flux

Does not account for transport in standard plasmas

Confined summary

Improved energy confinement times

• Runaway electron density ~ 2%
• Connection lengths ~ 100 km
• Diffusion coefficient < 5 m²/s
• Magnetic surfaces maybe becoming well-formed

Thermal diffusivity ~ 5 m²/sec

(getting close to electrostatic transport?)
**Plan**

**Plasma Control Systems**
- Pulsed Parallel Current Drive (further optimize $V_I$, $V_P$)
- Oscillating field current drive (medium power underway, high power under construction)
- Lower hybrid current drive (antenna tests underway)
- Electron Bernstein wave injection (low power tests underway)
- Neutral beam injection (Novosibirsk) (feasibility tests beginning)
- Pellet injection (with ORNL) (initial tests beginning)

**Evolving diagnostics**
- FIR polarimetry (UCLA) (equilibrium and fluctuating B)
- Heavy ion beam probe (RPI) (equilibrium, fluctuating potential, density)
- Motional Stark effect (equilibrium and fast B)
- Multi-point Thomson scattering (begin operation by summer, 02)